Attachment 5: Work Plan

PROJECT PURPOSE, GOALS, AND OBJECTIVES

The primary purpose of this project is to install monitoring wells at two locations (Figure Att5-1), and to equip the new wells with water level data loggers and low flow sampling pumps. The goals of this project include:

Goal 1: Fill key data gaps at the upgradient portions of the existing monitoring network area.

Goal 2: Improve understanding of groundwater conditions in areas of the basin shared by municipal agencies and small water systems

Goal 3: Improve understanding of groundwater gradients between the Soquel-Aptos area and the Pajaro Valley.

Specific objectives of the project include:

1. Installing monitoring wells at two locations. The Quail Run Tank Site and the Larkin Valley Tank Site will each be completed with two clustered wells. Each of the wells will target a specific aquifer.
2. Developing groundwater level data that will indicate hydraulic gradients across the SqCWD and PVWMA boundary.
3. Developing groundwater level and quality data that will characterize groundwater conditions in areas shared by municipal water agencies and small water systems.
4. Providing groundwater level data to use in estimating basin groundwater storage and recharge.
5. Providing groundwater level data to enhance the groundwater elevation contour maps prepared for the Annual Review and Report (ARR), which is part of implementation of the GWMP. The most recent ARR can be found at: http://soquelcreekwater.org/sites/default/files/2011-ARR-State%20of%20the%20Basin%20Report_Final.pdf.
6. Developing data that can be shared with other Stakeholders.

Apart from supporting the goals and objectives of the GWMP, as discussed in Attachment 4, the project also supports the objectives of the North Santa Cruz County Integrated Regional Management (IRWMP). These are:

Objective 1 – Water Supply Reliability (IRWMP, page 46).
Expanding the monitoring well network will provide groundwater level and quality data that will be used to make management decisions that will minimize impacts of drought and overdraft on regional groundwater supplies.

Objective 2 - Maximize the Quality of Delivered Drinking Water as well as Reclaimed Water for Irrigation (IRWMP, page 46).
Monitoring wells will provide a means of monitoring groundwater quality to ensure that drinking water extraction meets State and Federal standards.

Objective 9: Regional Collaboration (IRWMP, page 48).
This project will continue and expand collaboration among public and private agencies to address county water-related challenges.

DESCRIPTION OF WORK

The proposed scope of work is divided into five tasks. The tasks are:

1) Pre-Construction Activities;
2) Drilling, Well Construction, and Development;
3) Equipping Monitoring Wells;
4) Reporting; and
5) Project Administration.

A detailed description of the work items to be performed for each task is presented below:

TASK 1: PRE–CONSTRUCTION ACTIVITIES

Prior to conducting field activities, SqCWD and its consulting groundwater hydrologist will develop drilling specifications, contract documents, and secure a drilling contractor. The drilling contractor will be responsible for obtaining well construction permits from Santa Cruz County for each individual monitoring well to be drilled. In Santa Cruz County, it typically takes one week to obtain such permits. No special use permits from government agencies or environmental compliance permits are anticipated as the new monitoring wells

are Categorically Exempt under CEQA Article 19, Categorical Exemptions, Code Section 15303, Class III, New Construction or Conversion of Small Structures. Because the sites are owned by SqCWD, no access agreements will be required.

A complete set of biddable drilling specifications will be developed for the four monitoring wells. The specifications will be based on previous specifications recently developed by SqCWD for similar wells, and will incorporate specific sections for well construction and development. The specifications will be included in a contract document that SqCWD will prepare as part of the bid package.

SqCWD will broadly advertise the project and will also directly solicit bids from local drilling contractors with the technical capabilities and qualifications to drill and construct the proposed wells. The lowest bid that complies with the bidding requirements will be recommended for acceptance. The recommended contractor will be licensed in the State of California with a valid C-57 license. The SqCWD Board of Directors will then enter into a contract with the selected contractor. The contract will meet the data reporting requirements of the agreement with DWR.

TASK 2: DRILLING, WELL CONSTRUCTION, AND DEVELOPMENT

The boreholes will be drilled using the direct-rotary method. This method of drilling has been successful in installing recent monitoring wells in the area. All wells will be constructed in conformance with all applicable standards, including the State of California Water Well Standards as described in the Department of Water Resources (DWR) Bulletin No. 74-81 and amended in Bulletin 74-90. The boreholes will be 8 ¾-inches in diameter. All drilling will be overseen by a professional geologist registered in the State of California.

At each location, the borehole for the deepest monitoring well will be drilled first. During drilling, lithologic samples from the borehole will be collected and logged by a professional geologist registered in the State of California at minimum 10-foot intervals. After reaching final depth, geophysical logs will be run on this deepest borehole. The suite of geophysical logs will include 16" and 64" normal resistivity, spontaneous potential, and natural gamma surveys.

After the deepest borehole at each site has been drilled and the geophysical surveys completed, the final well completion depths will be determined for each of the monitoring wells. The remaining boreholes at that location will be drilled

based on the lithologic and geophysical logs from the deepest borehole. While each borehole is being drilled, a professional geologist registered in the State of California will collect lithologic samples at minimum 10-foot intervals to substantiate the lithologic interpretation from the first borehole. The samples of drill cuttings will be placed in suitably labeled zip-lock type plastic bags. All bags shall be labeled to indicate the depth interval, date, and well number of the collected sample. The samples shall be properly stored in a manner as to prevent breakage or loss until the end of the project.

Two-inch diameter schedule 80 PVC (ID of 1.9 inch) casing and wells screen will be installed in each borehole. Casing joints will be flush threaded. Centralizers will ensure that the casing is centered in the borehole – providing a 3-inch annulus around each well. A filter pack of 8x16 filter material will extend from the bottom of the borehole to approximately ten feet above the screen. Five feet of hydrated bentonite chips will be placed above the filter material, and an annular seal of neat cement grout or sand-cement slurry will be placed to the surface. All wells will be completed with bolt-down water-tight traffic boxes. Figure Att5-2 shows a typical well construction.

The monitoring wells will be developed through air-lifting and pumping and surging until the water is clear. Following development, water quality samples will be collected for total dissolved solids, pH, salinity, and major cations and anions. These samples will provide baseline data for comparison to future analyses. Each well will be completed with a traffic box or similar at-grade completion. The wells will be surveyed both vertically and horizontally. A well completion report will be completed and a copy will be included in the final report.

It is assumed that drilling and well installation will take place on a 10 hour per day basis. Based on past drilling projects, it is assumed that all drilling, construction and development work for the four monitoring wells will be completed in approximately three weeks.

TASK 3: EQUIPPING MONITORING WELLS

Each of the new monitoring wells will be equipped with pressure transducers data loggers and low flow sampling pumps. The pressure transducers will be accurate to within one-half of one percent full scale reading. Each water level transducer will be tested for accuracy prior to installation. SqCWD will install

Schlumberger Diver transducers and QED bladder pumps, which are SqCWD's standard equipment for wells in the monitoring network.

Data loggers will be securely fastened to a lockable PVC well cap. Each data logger will be installed above the sample pump.

The bladder pumps will be set up to sample water from the middle of the screened interval. The pump will be secured to the well cap along with the data logger.

TASK 4: REPORTING

Due to the expected project duration of only 21 weeks, it is likely SqCWD will submit only one quarterly report to DWR. The report will include an executive summary, description of project operations to date, description of major accomplishments, discussion of any issues or concerns that may affect the schedule or budget, discussion of activities planned for the following quarter, cost and schedule information.

Upon completion of the project, SqCWD will first prepare a draft report that will include all data, permits, field notes, well logs, and geophysical logs. The report will be a comprehensive document that will include a comparison of the planned schedule with the actual timeline, discussion of major problems encountered, a summary of all costs, and a detailed description and analysis of project results. Once the draft report has been presented to the SqCWD Board, comments received will be incorporated into a final report.

All data and reports will be provided to members of the Basin Advisory Group (BAG), who are representatives from surrounding water agencies: City of Santa Cruz, Pajaro Valley Water Management Agency, Central Water District, and Santa Cruz County. Where possible electronic data will be made available to these agencies. Small water systems in the area will also be notified and provided access to the data and reports. The report will be posted on SqCWD's website for wider public availability.

TASK 5: PROJECT ADMINISTRATION

SqCWD staff will be responsible for project management activities, including contracting with DWR, accounting, and project closeout with DWR.

PERFORMANCE OF THE PROJECT

SCHEDULE AND BUDGET MANAGEMENT

The budget for this project will be tracked at two levels: SqCWD will track budgets in their internal accounting system, and SqCWD's groundwater consultant will track budgets independently. Budgets and schedules will be updated monthly based on the consultant's monthly invoices. Budget and schedule management additionally tied to the quarterly reporting plan. The quarterly reports will identify progress to date, compare actual progress with the anticipated schedule, identify where the schedule and budget have slipped, and propose methods for addressing and problems with budget or schedule.

DRILLING OVERSIGHT

As mentioned in the Scope of Work, the drilling operation will be overseen by a professional geologist registered in the State of California. Based on our history of successful well installation, developing strong well specifications is not enough; the specifications must be enforced in the field. Although the geologist will be onsite for the entire borehole drilling, well constructing, and well development operations to enforce the specifications, certain key times will require particular attention:

- Determining well depths. The wells will be designed to monitor particular aquifers. The lithologic cuttings and geophysical logs will be evaluated closely to establish the depths of the targeted aquifers.

- Constructing the well. Particular attention will be paid to make sure the well materials are exactly as specified, the well is lowered to the required depth, and the annular material is placed at correct depths. Specifications include clauses stating that if the driller cannot place the annular material correctly, they will be required to abandon the hole at their expense.

- Well development. The wells will be developed until the pumped water is clear and free of particles. A groundwater sample will be taken to verify this and submitted to a certified laboratory got analysis.

- Groundwater data logger calibration. The data loggers to be installed in each well will be calibrated prior to installation. Manual soundings

will be taken concurrently with the logger to ensure the depths being recorded are accurate.

ONGOING USE

Data from the new monitoring wells will be incorporated into SqCWD's ongoing groundwater monitoring system. Groundwater level monitoring equipment will remain in the monitoring wells after the conclusion of this project. Data collection from the wells and data storage will be funded by SqCWD. Ongoing monitoring well maintenance will also be funded by SqCWD through its regular operations and maintenance budget to ensure the wells and equipment continue to collect high quality data. Semi-annual water quality testing from these wells will be funded by SqCWD.

Each year, data from the monitoring wells will be used in the ARR. This annual document is part of the implementation of the GWMP for the Soquel-Aptos basin. The ARR summarizes groundwater conditions in the Soquel-Aptos basin, documents the status of groundwater management activities, and recommends any amendments to the GWMP. In particular, the groundwater level data will be used to expand the groundwater elevations used for generating the Spring and Fall contour maps (Figures Att4-3 and Att4-4).

One or a number of the wells may be selected for inclusion in the California Statewide Groundwater Elevation Monitoring (CASGEM) effort for the area. In this case, the data will be sent to Santa Cruz County who is the CASGEM monitoring entity. The County submitted April 2012 groundwater level data to CASGEM in June 2012 (personal communication, Mike Cloud, Santa Cruz County). Currently, 46 of the 124 wells in the County's CASGEM monitoring plan are SqCWD monitoring wells.

The geophysical and lithologic data generated during the drilling process is of importance to the County and other stakeholders for defining the contact between the Aromas and Purisima, and contacts between various Purisima units in the region. These aquifers are the sole supply for SqCWD, CWD, and small water systems in the area.

INFORMATION DISSEMINATION

Information generated from this project will be disseminated at SqCWD Board of Director meetings, Basin Advisory Group (BAG) meetings, and Basin Implementation Group (BIG) meetings. Small water systems will also be notified about the availability

of the information. In addition, the public will be able to access the information through the SqCWD's website, and hardcopies will be available at SqCWD's offices.

COLLABORATION WITH STAKEHOLDERS

The Joint Exercise of Powers Agreement (JPA) between SqCWD and CWD provides for the duties and governance structure of a Basin Implementation Group (BIG), which meets at least annually. The BIG also includes an at-large member who is typically associated with a small water system. It is the primary responsibility of the BIG to:

1) Assure that the goals and objectives identified in the GWMP are pursued in a reasonable and timely manner;
2) Be accountable for the quality and accuracy of all reports associated with the groundwater management plan implementation;
3) Modify the GWMP as needed to address any new or escalated issues within the groundwater basin;
4) Direct future updates to the GWMP every five years or more frequently if needed to reflect changes in State law or in local conditions/programs.

The Basin Advisory Group (BAG) provides technical expertise necessary to guide and implement the groundwater management activities, as well as provide interagency coordination. The BAG consists of SqCWD, Central Water District (CWD), City of Santa Cruz (City), Pajaro Valley Water Management Agency (PVWMA) and Santa Cruz County. This group meets at least annually to:

1) Discuss the status of the groundwater basin
2) Review progress on the management goals and objectives as outlined in this GWMP; and
3) Develop a recommended work plan for the following year.

For this project, the BAG will meet to discuss the depths of monitoring wells and targeted aquifers before the technical specifications are finalized. After drilling each well, Santa Cruz County's geologist will be consulted regarding interpretation of the geophysical logs and final well completion based on identified aquifer contacts observed on the logs.

The data collected in this study is very important to SqCWD as well as a number of Stakeholders in the Soquel-Aptos area. These Stakeholders include members of the BAG: Central Water District (CWD), Pajaro Valley Water Management Agency (PVWMA), and Santa Cruz County. Additional stakeholders include small water

systems and private well owners. A representative from a small water system typically fills the at-large seat on the BIG. The BAG and BIG annually meet to review the ARR, which will include data and analysis of the data obtained at the proposed monitoring wells. The members of the BAG and BIG will be able to discuss and plan groundwater management in relation to the data. The BIG may invite a larger group of small water systems and private well owners to discuss groundwater management in relation to the data.

PROJECT DELIVERABLES

As outlined in the Scope of Work, the project deliverables will include the following:

- Quarterly Report. Given the expected project schedule of 20 weeks, one quarterly progress report required by DWR will be prepared and submitted. The report will demonstrate that the project is proceeding as planned, and that the grant funding is being expended in accordance with the grant requirements. The report will include a description of progress made for the reported quarter, an update on the budget for each project task, an update on the status of each project task, and a description of work expected to be completed by the end of the project.
- Draft and Final Report. The draft report will include all data, analyses, permits, and results developed during the project. The draft will be distributed electronically. Specifics that will be included in the report include:
    - Lithologic and geophysical logs for all boreholes
    - Well completion diagrams
    - Copies of well permits
    - Hydrographs from each well equipped with data loggers
    - Water quality laboratory results
    - Photographs of lithologic samples taken every 10 feet

  An example of the type of report that will be prepared can be found at: http://soquelcreekwater.org/sites/default/files/MW_Project_Report_draft.pdf.

After review of the report by the SqCWD Board, it will be finalized and published as a Final Report. Ten hardcopies of the report will be produced,

REFERENCES

Cloud, personal communication. Mike Cloud, Hydrologist at County of Santa Cruz Health Services Agency. June 2012.

HydroMetrics WRI. 2012. Soquel-Aptos Area Groundwater Management Annual Review and Report Water Year 2011. May. Accessible online at: http://soquelcreekwater.org/sites/default/files/2011-ARR-State%20of%20the%20Basin%20Report_Final.pdf

Soquel Creek Water District and Central Water District. 2007. Groundwater management plan -2007 Soquel-Aptos area. Santa Cruz County, California. April.

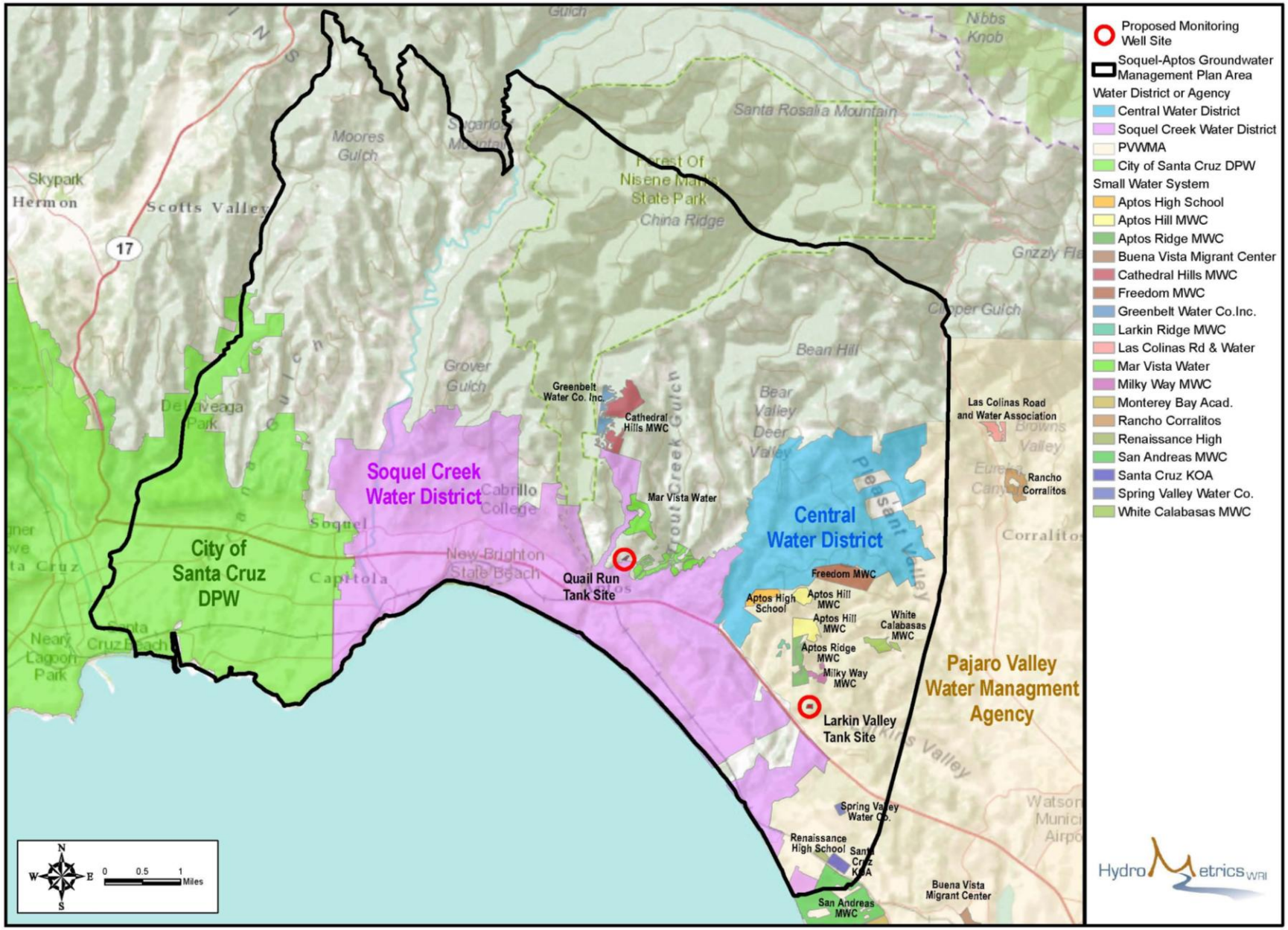

Figure Att5-1: Proposed Monitoring Well Sites

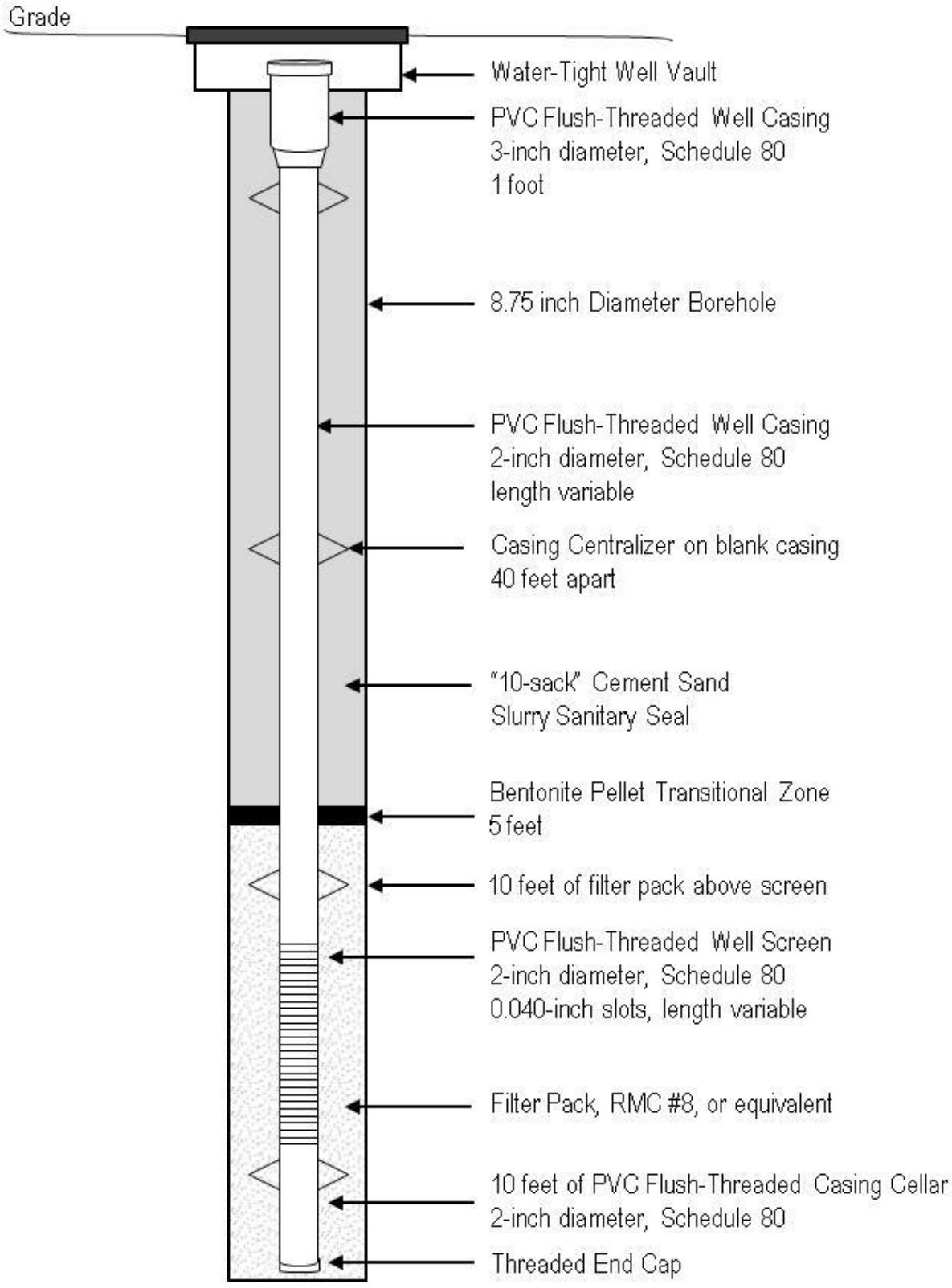

Figure Att5-2: Typical Monitoring Well Construction